Geographical distribution of challenging weed species

Current knowledge in organic arable farming in the Baltic sea region

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Introduction

They create a great source of agro biodiversity, generating habitats and food sources for other organisms; yet weeds have always posed the greatest challenge in organic agriculture from the perspective of production.

Because of the specific agricultural management of this farming system, several groups of weed species have naturally adjusted. These can be highly competitive to the crop, acquire high inputs to remove and/or spread rapidly.

In this leaflet we will describe the most challenging weed species in organic spring sown cereals in the geographical area of the Baltic sea, based on existing literature and information provided by extension services.

We will show and discuss their distribution from country to country and propose a classification system.

This research is conducted within the international project of PRODIVA, part of Core Organic, whose research interest is the crop and weed biodiversity interaction in organic arable agriculture. Countries involved are: Denmark, Finland, Germany, Latvia, Poland and Sweden.

Weed Types

There is no such thing as ‘that one challenging weed specie’; there are many weed species that in different ways pose a challenge to the crop. This is based on their survival strategies, physiology, life cycle and competition pressure for water, light and nutrients.

From these elements we composed five different weed classes, based on the weed classes as mentioned by Holzner and Glauninger (2005)*, dividing weed species into classes according to their specific strategies.

Annuals:

- The Bodybuilders

These are the strong developing, high biomass, highly visible, high competitive species of annuals. These include *Chenopodium album*, *Centaurea cyanus*, *Avena fatua* etc.

- The Early Birds

These annuals rely on a quick establishment in spring and can be competitive during the establishment of the crop. However, later in the season the tend to lose their competitiveness if not densely grown. Think of *Stellaria media*, *Lamium purpureum*, *Viola arvensis*. This group also includes the more flexible and opportunist weed species like *Matricaria inodorata*, *Apera spica-venti* and *Papaver rhoeas*. This species are also less competitive to the crop.

W. Holzner & J. Glauninger, 2005. Ackerunkräuter, bestimmung, biologie, landwirtschaftliche bedeutung. 264p

- The Plebeians

The species of annuals who are often visibly present, but rarely have an competitive impact. Sometimes form a problem when occurring in high densities. These are species like *Spergula arvensis*, *Fumaria officinalis* and *Myosotis arvensis*.

Perennials

- The Zombies

The weed species in this category of perennial often have strong root systems and are extremely resilient. Therefor they need a lot of energy input to get rid of. They can be strong competitors. Examples of species are *Elytrigia repens*, *Cirsium arvense* and *Sonchus arvensis*.

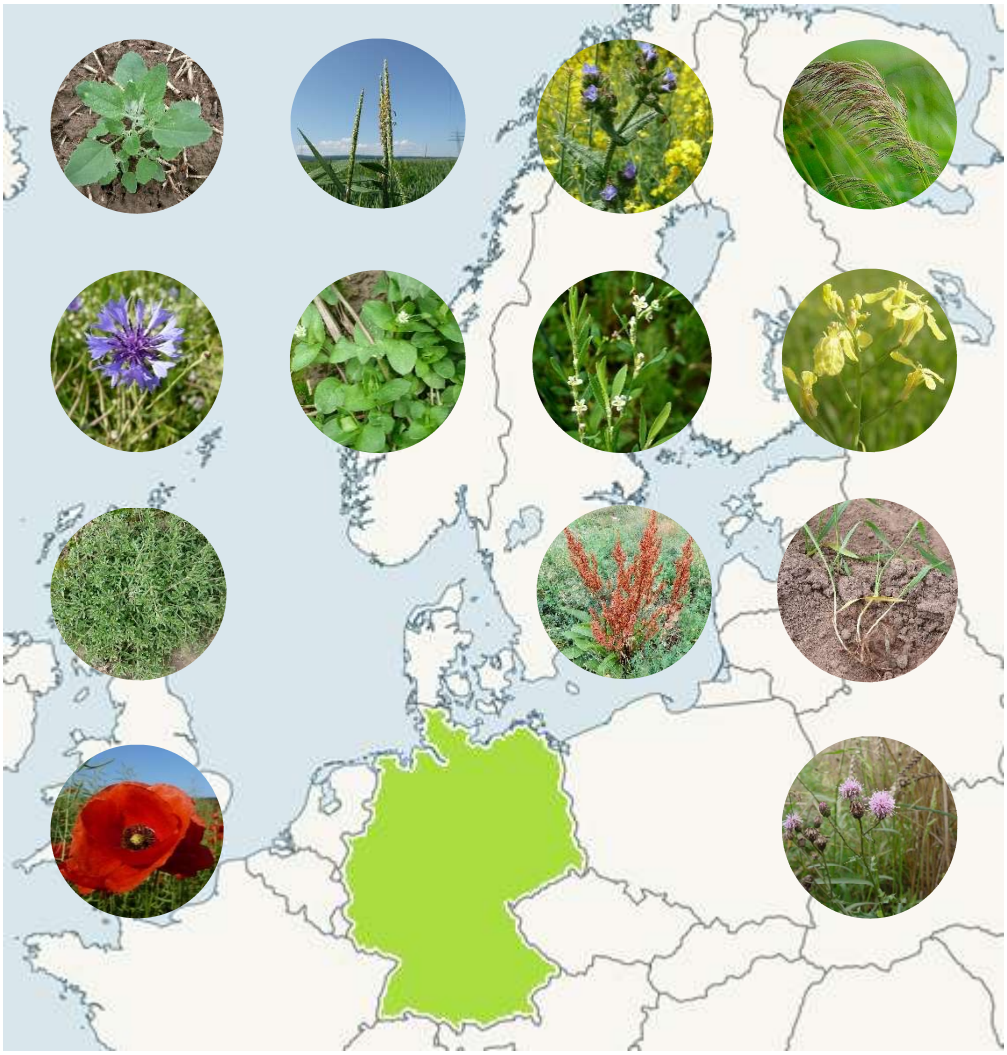
- The grassland species

These species are normally common weeds in grassland systems. They are seen wandering into the arable fields, benefiting of the grass-clover ley often implemented in organic crop rotations. Some of the species here are *Taraxacum officinale* and *Ranunculus repens*.

Overview species

Latin Name	Germany	Denmark	Sweden	Finland	Latvia	Poland	Type
Chenopodium album	x	x	x	x	x	x	Bodybuilder
Polygonum spp.	x	x	x	x	x	x	Bodybuilder
Centaurea cyanus	x	x	x		x	x	Bodybuilder
Galeopsis spp.		x	x	x	x	x	Bodybuilder
Stellaria media	x	x		x		x	Early bird
Galium aparine	x		x			x	Early bird
Raphanus raphanistrum	x					x	Bodybuilder
Sinapis arvensis		x	x				Bodybuilder
Galeopsis tetrahit			x			x	Bodybuilder
Matricaria inodora		x				x	Early bird
Apera spica-venti	x				x		Early bird
Lamium purpureum				x	x		Early bird
Viola arvensis				x	x		Early bird
Spergula arvensis			x	x			Plebeian
Alopecurus myosuroides	x						Bodybuilder
Avena fatua				x			Bodybuilder
Anthemis arvensis						x	Early bird
Papaver rhoeas	x						Early bird
Galinsoga parviflora						x	Early bird
Erysimum cheiranthoides				x			Plebeian
Fumaria officinalis					x		Plebeian
Anchusa arvensis	x						Plebeian
Matricaria discoidea			x				Plebeian
Myosotis arvensis				x			Plebeian
Brassica rapa ssp.		x					Bodybuilder
Thlaspi arvensis			x				Early bird
Veronica arvensis					x		Plebeian
Amsinckia micrantha		x					Plebeian
Elytrigia repens	x	x	x	x	x	x	Zombies
Cirsium arvense	x	x	x	x	x	x	Zombies
Equisetum arvense		x	x	x	x	x	Zombies
Sonchus arvensis		x	x	x	x		Zombies
Rumex spp.	x		x	x			Zombies
Tussilago farfara		x	x	x			Grassland
Ranunculus repens			x	x			Grassland
Taraxacum officinale			x	x			Grassland
Artemisia vulgaris		x			x		Grassland

Germany



Species	Type
Stellaria media	Early bird
Galium aparine	Bodybuilder
Chenopodium album	Bodybuilder
Apera spica-venti	Early bird
Alopecurus myosuroides	Bodybuilder
Centaurea cyanus	Bodybuilder
Polygonum aviculare	Bodybuilder
Papaver rhoeas	Early bird
Raphanus raphanistrum	Bodybuilder
Anchusa arvensis	Plebeian
Cirsium arvense	Zombies
Rumex spp.	Zombies
Elytrigia repens	Zombies

Poland

Species	Type
Chenopodium album	Bodybuilder
Stellaria media	Early bird
Centaurea cyanus	Bodybuilder
Polygonum convolvulus	Bodybuilder
Galinsoga parviflora	Early bird
Matricaria inodora	Early bird
Anthemis arvensis	Early bird
Galeopsis tetrahit	Bodybuilder
Galium aparine	Bodybuilder
Raphanus raphanistrum	Bodybuilder
Cirsium arvensis	Zombies
Elytrigia repens	Zombies
Equisetum arvense	Zombies

Latvia

Species	Type
Polygonum convolvulus	Bodybuilder
Viola arvensis	Early bird
Chenopodium album	Bodybuilder
Galeopsis spp.	Bodybuilder
Veronica arvensis	Plebeian
Lamium purpureum	Early bird
Fumaria officinalis	Plebeian
Centaurea cyanus	Bodybuilder
Apera spica-venti	Early bird
Elytrigia repens	Zombies
Equisetum arvense	Zombies
Cirsium arvense	Zombies
Sonchus arvensis	Zombies
Artemisia vulgaris	Grassland

Finland

Species	Type
Chenopodium album	Bodybuilder
Stellaria media	Early bird
Spergula arvensis	Plebeian
Galeopsis spp.	Bodybuilder
Polygonum persicaria	Bodybuilder
Erysimum cheiranthoides	Plebeian
Viola arvensis	Early birds
Avena fatua	Bodybuilder
Myosotis arvense	Plebeian
Lamium purpureum	Early bird
Elytrigia repens	Zombies
Sonchus arvensis	Zombies
Cirsium arvensis	Zombies
Taraxacum officinale	Grassland

Denmark

Species	Type
Sinapsis arvensis	Bodybuilder
Brassica rapa	Bodybuilder
Galeopsis spp.	Bodybuilder
Tripleurospermum maritimum ssp. Inodorum	Early bird
Amsinckia micrantha	Plebeian
Polygonum persicaria	Bodybuilder
Centaurea cyanus	Bodybuilder
Chenopodium album	Bodybuilder
Stellaria media	Early bird
Cirsium arvense	Zombies
Elytrigia repens	Zombies
Tussilago farfara	Plebeian
Sonchus arvensis	Zombies
Artemisia vulgaris	Grassland
Equisetum arvense	Zombies

Sweden

Species	Type
Galeopsis tetrahit	Bodybuilder
Matricaria discoidea	Early bird
Polygonum persicaria	Bodybuilder
Galium aparine	Bodybuilder
Chenopodium album	Bodybuilder
Polygonum aviculare	Bodybuilder
Spergula arvensis	Plebeian
Sinapis arvensis	Bodybuilder
Thlaspi arvensis	Plebeian
Centaurea cyanus	Bodybuilder
Cirsium arvense	Zombies
Elytrigia repens	Zombies
Sonchus arvensis	Zombies
Taraxacum officinale	Grassland

PRODIVA

Interesting to note is that most of the most challenging weeds stem from the categories of Bodybuilders and Zombies, this most likely due to their competitiveness with the crop and resistance against weed control. Most of these species are actually shared between most counties. The country specific species are more often member of the Early birds, Plebeian or even grassland species. This is probably caused by the distribution of weed species and their adaption to their local environment.

We have to consider that the competitiveness of weeds relies heavily on local conditions, such as soil type and climate. But the similarities are noteworthy.

This data will be further used in the research of the PRODIVA project, comparing this database with weed communities found in the field.

To get to know more about PRODIVA and Core Organic please visit the website:

http://coreorganicplus.org/research-rojects/prodiva/

or contact: bo.melander@agro.au.dk.

Photo sources









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